

“Music Query, Analysis, and Style Simulation”

Music 254/CS 275b

Spring 2014

Stanford University

Website

<http://music254.stanford.edu>

or:

<http://cs275b.stanford.edu>

Syllabus (see link near top of above pages):

http://wiki.ccarh.org/wiki/Music_254/CS_275b_Syllabus

Instructors:

Eleanor Selfridge-Field (esfield at stanford)

Craig Stuart Sapp (craigsapp at gmail)

Grading

Credits: 2 – 4

Grading: 25% class participation
75% project

Project deadlines:

16 April 2014: 3 page proposal (beginning of the third week)

- background on the topic you are interested in.
- survey of prior art.
- what you propose to do for the project in the next 7 weeks.

4 June 2014:

- project presentation (20-30 minutes)
- project write-up, draft version (5+ pages)

11 June 2014:

- project write-up (10 – 20 pages)

- Also, project updates and meetings throughout the quarter.

Project Ideas

- Musical Data Analysis
- Performance Analysis
- Music Generation (difficult)
- Notation (for Analytic display / performance)
- Sound Analysis (background in DSP preferred)

Music Searching

Themefinder
[About | Search options | Help]
[New Links | Composers | Random]

[.Take the Quartet Quiz.](#)

Repertory

Pitch

Interval

Scale Degree

Gross Contour

Refined Contour

Location ☒ beginning of theme only, or ☐ anywhere in theme

Key

Mode

Meter

Sponsored by the
Center for Computer Assisted Research in the Humanities

- <http://www.themefinder.org>
- Search for themes based on various musical features
- related paper:
“Search Effectiveness Measures for Symbolic Music Queries in Very Large Databases”.

<https://ccrma.stanford.edu/~craig/papers/04/ismir2004slf.pdf>

Student project turned into paper:

- Algorithm for Polyphonic Music Retrieval: The Hausdorff Metric and Geometric Hashing
http://ca400.alangreene.net/research/ISMIR2007_p457_romming.pdf

Josquin Research Project

About JRP | Editorial policies | Report error | Support project | Advanced users | Contact

The Josquin Research Project

Project Director: Jesse Rodin, Stanford Music
Technical Director: Craig Sapp, CCARH

WORK LIST

Go to: [Anonymous](#) | [Agricola](#) | [Busnoys](#) | [Compère](#) | [Du Fay](#) | [Japart](#)
[Josquin](#) | [La Rue](#) | [Martini](#) | [Mouton](#) | [Obrecht](#) | [Ockeghem](#)
[de Orto](#) | [Pipelare](#) | [Regis](#)

No. Title (click title for more info.) ☒ Scores ☒ MIDI Voices

Anonymous (8 works)

3003	À cheval (Escorial B)	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	3
3001	Fama malum (Brussels 228)	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	4
1002	Sanctus Super iste puer magnus (Munich 3154)	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	4
1001	Missa [Bergerette savoytienne] (Jena 32)	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	4
2002	O beate Sebastiane (Trent 90)	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	3
3004	O Belle dyane (Laborde)	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	3
3002	Tambur tambur (Cortona /Paris)	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	4
3005	Textless piece à 3 (Verona 757)	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	3

Alexander Agricola (2 works)

1001	Missa In myne zin	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	4
1004	Missa Malheur me bat	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	4

Antoine Busnoys (5 works)

2003	Anima mea liquefacta est / Stirips Jesse	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	3
2004	Anthoni usque limina	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	5
3064	Armours fait moult tant / Il est de bonne heure né / Tant que nostre argent dura	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	4
3009	Bel Accueil le sergent d'Amours	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	3
1001	Missa L'homme armé	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> M	4

SEARCH TOOLS

Pitch
Interval
Rhythm

Sort by

Accidentals

Composer

Genre

Mensuration

[instructions](#)

ANALYSIS TOOLS

Repertory

Thematic index
 Vocal ranges
 Parallel octaves/fifths
 Measure-long rhythmic patterns
 Attacks per measure

- <http://josquin.stanford.edu>
- 1200 searchable works
- Basic online analysis tools
- Data available for off-line analysis

low-level access to musical data:

<https://github.com/josquin-research-project/jrp-scores>

Machine Learning (CS229) Projects

Fall 2013 Quarter

Composer Style Attribution

Jacqueline Speiser and Vishesh Gupta

<http://cs229.stanford.edu/proj2013/CS229-FinalProject.pdf>

Attribution of Musical Works to Josquin des Prez

Philip Lee, Kate Suckman, Zachary Sundberg

<http://cs229.stanford.edu/proj2013/SunbergStuckmanLee-AttributionOfMusicalWorksToJosquinDesPrez.pdf>

Application of Classification Algorithms to Renaissance Music Attribution

Alex Adamson

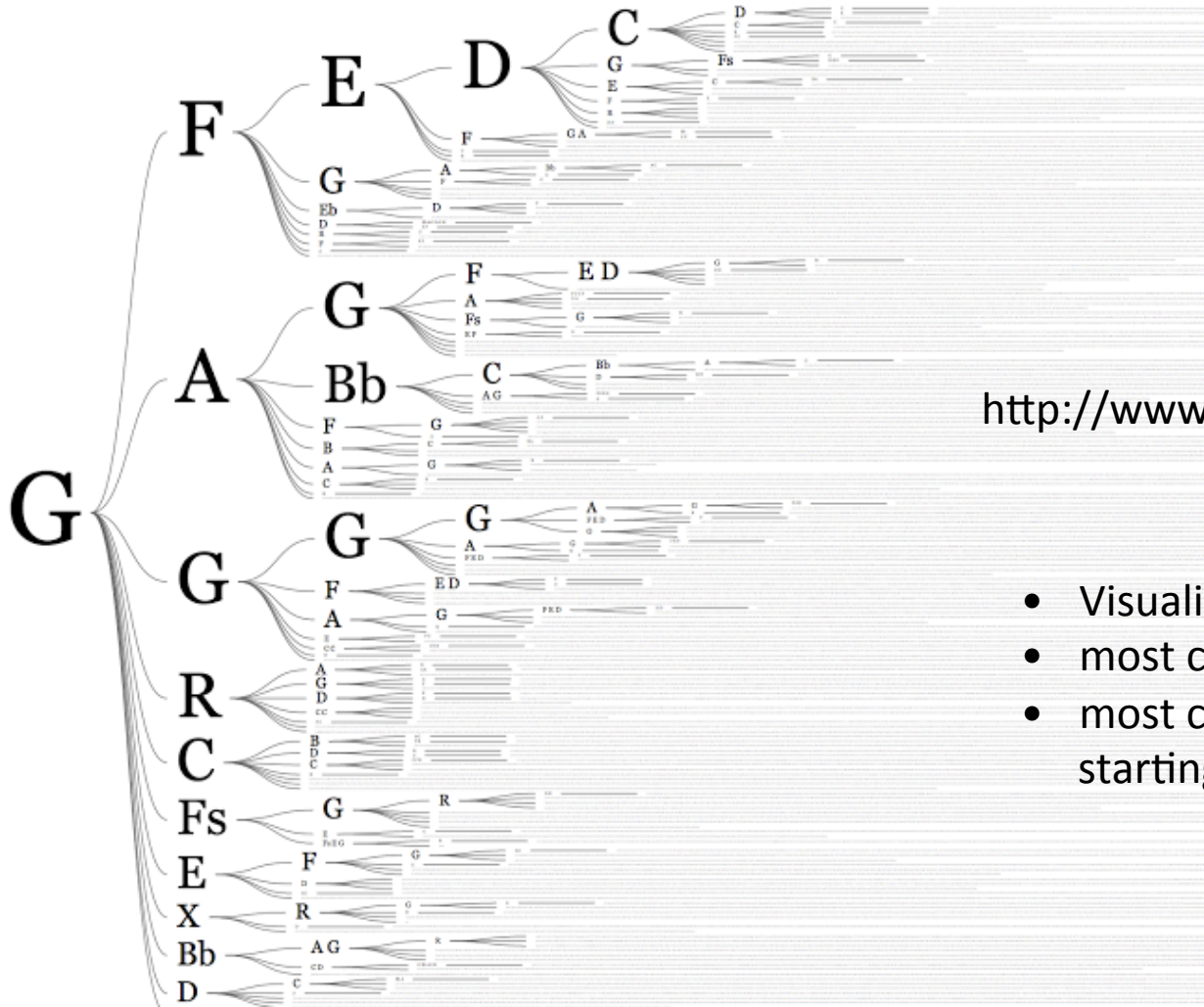
<http://cs229.stanford.edu/proj2013/Adamson-JosquinMusicAttributionProject.pdf>

Reveal Hidden Information in the Music Scores: Composer Attribution

Fang-Chieh Chou, Yi-Hong Kuo, Hsiang-Yu Yang

<http://cs229.stanford.edu/proj2013/ChouKuoYang-RevealHiddenInformationInTheMusicScoresComposerAttribution.pdf>

Data Visualizations



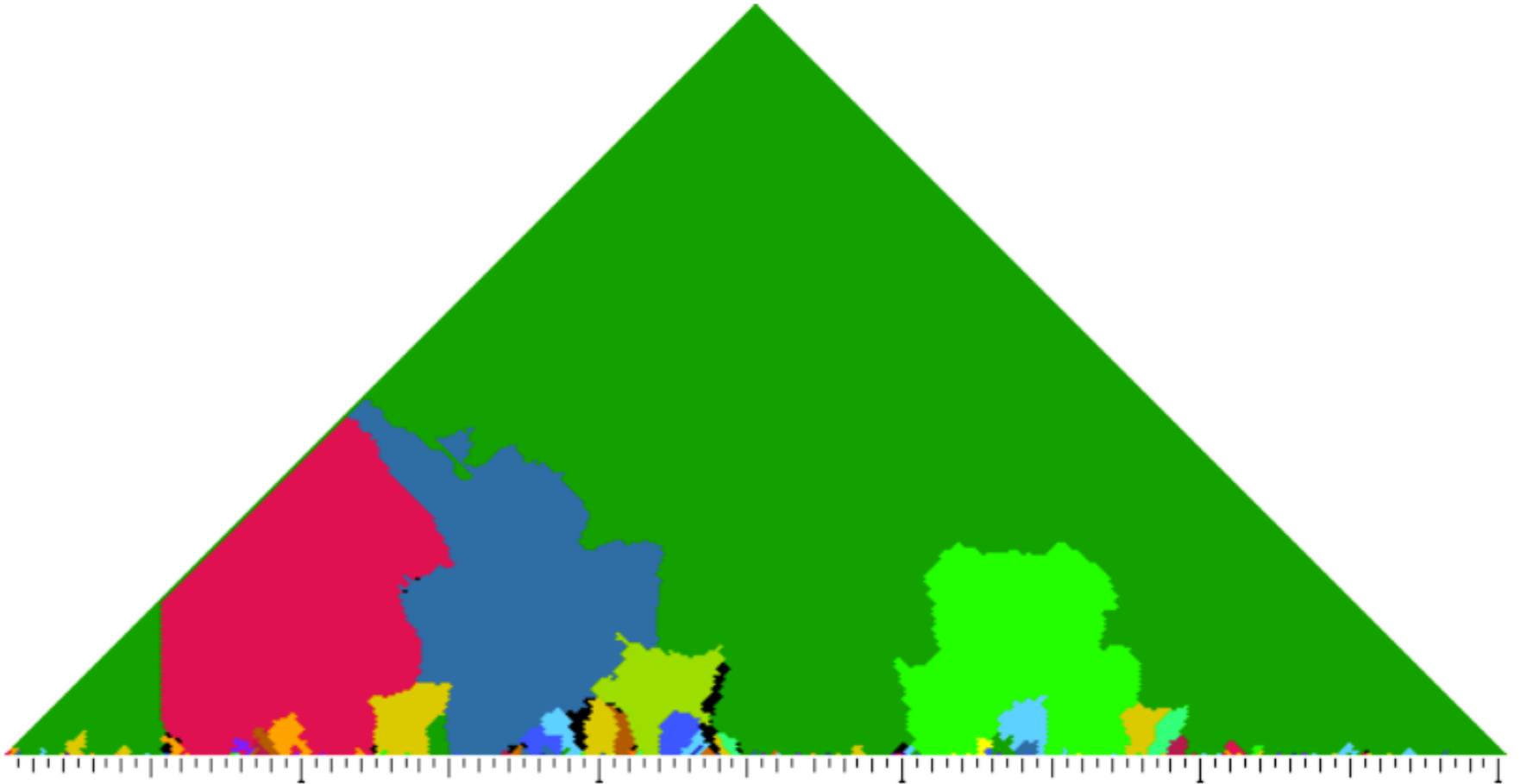
“Note Tree”

based on word trees:

<http://www.jasondavies.com/wordtree>

- Visualization of Markov chains.
- most common note after G is F.
- most common 5-note pattern starting on G is G-F-E-D-C.

Harmonic Visualizations

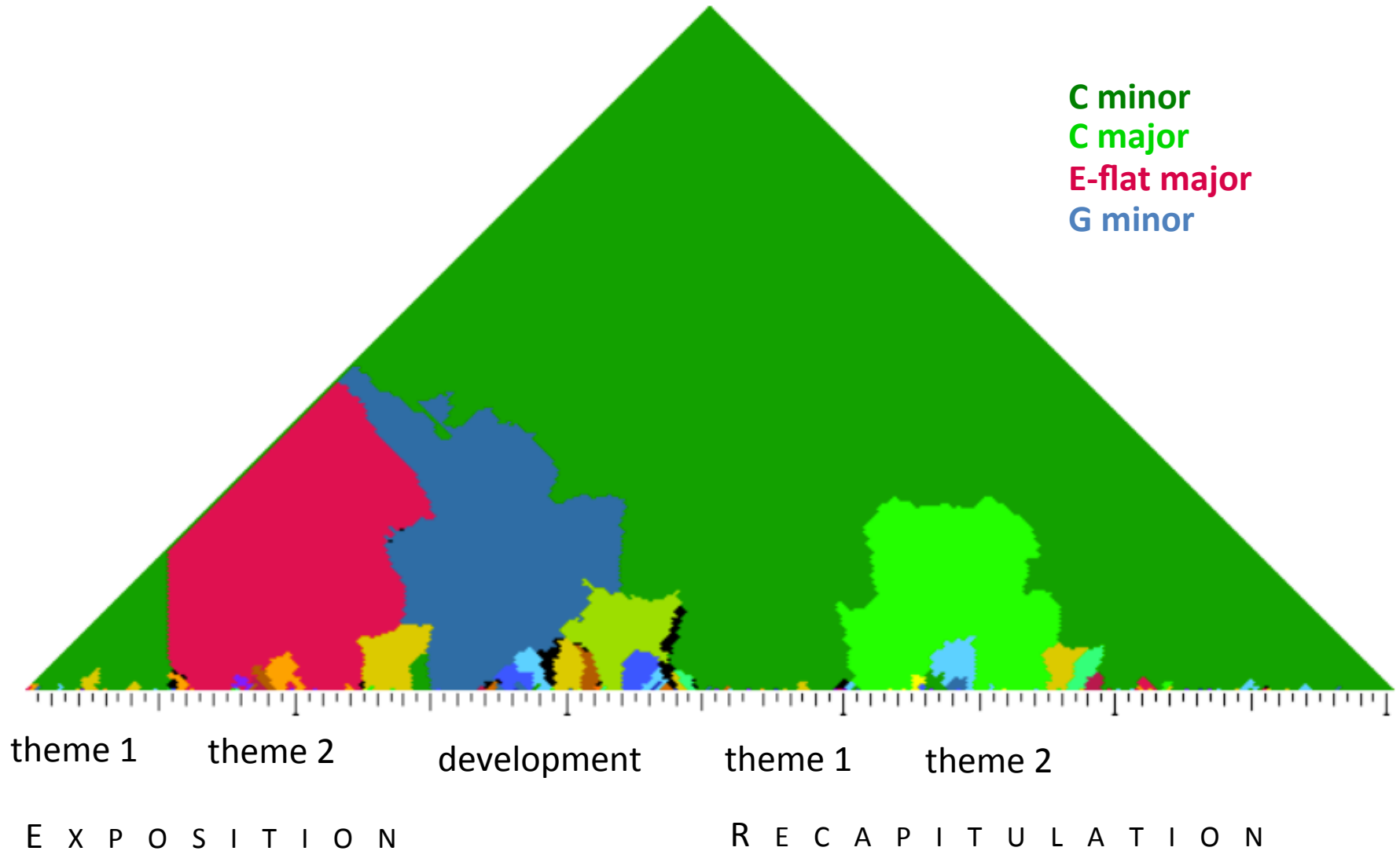


Beethoven's 5th Symphony, Movement 1: Sonata form

see: <http://purl.stanford.edu/br237mp4161>

Harmonic Visualizations

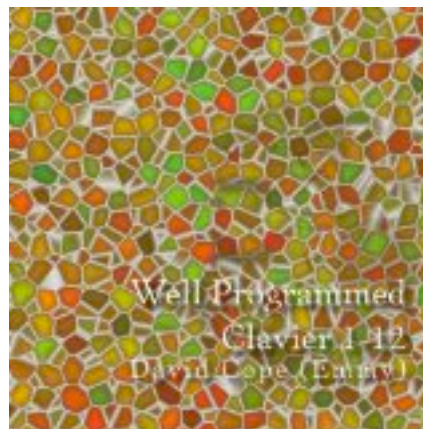
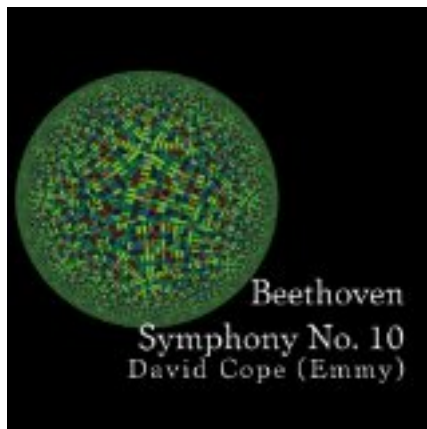
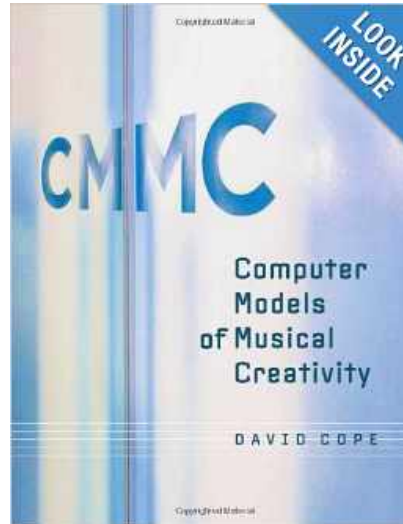
Beethoven's 5th Symphony, Movement 1: Sonata form



Music Generation



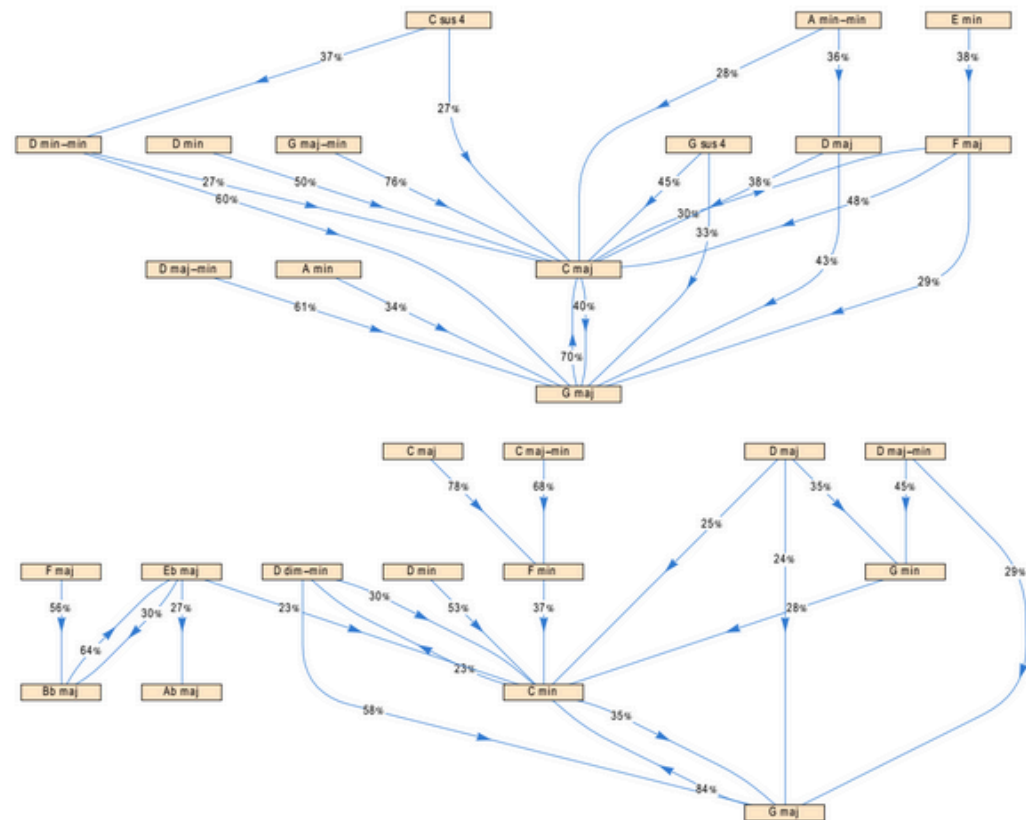
David Cope



Music Generation: Harmonization

AN ALGORITHMIC APPROACH TO MELODIC HARMONIZATION

Nathaniel Eiseman



Bayesian statistical analysis of Bach chorales for automatic harmonization of melodies

Musical Data Resources

<http://kern.humdrum.org>

The screenshot shows the KernScores website. At the top, the title 'Kern Scores' is displayed in a large, stylized font, with 'Kern' in red and 'Scores' in blue. Below the title, a description reads: 'A library of virtual musical scores in the Humdrum ****kern** data format. Total holdings: 7,866,496 notes in 108,703 files.' A search bar is located below the description, with the label 'search:' and a text input field. To the left of the search bar are links for 'browse' and 'shortcuts'. To the right is a dropdown menu set to 'Text' and a checkbox labeled 'anchored'. Below the search bar, there are two columns of links: 'A guided tour of the KernScores website', 'Recent additions to the KernScores library', 'Data Collection Highlights', 'Online Humdrum Editor', 'CCARH Humdrum Portal', and 'Contribute kern scores'. The main content area is divided into two sections: 'Composers' and 'Genres'. The 'Composers' section lists 25 composers in a 5x5 grid, with 'Corelli' highlighted in blue. The 'Genres' section lists 12 genres in a 4x3 grid.

Kern Scores

A library of virtual musical scores in the Humdrum ****kern** data format.
Total holdings: 7,866,496 notes in 108,703 files.

search:

[browse](#) | [shortcuts](#) ☐ anchored

[A guided tour of the KernScores website](#) [Online Humdrum Editor](#)
[Recent additions to the KernScores library](#) [CCARH Humdrum Portal](#)
[Data Collection Highlights](#) [Contribute kern scores](#)

Composers

Adam	Chopin	Giovannelli	Lassus	Schubert
Alkan	Clementi	Grieg	Liszt	Schumann
J.S. Bach	Corelli	Haydn	MacDowell	Scriabin
Banchieri	Dufay	Himmel	Mendelssohn	Sinding
Beethoven	Dunstable	Hummel	Monteverdi	Sousa
Billings	Field	Isaac	Mozart	Turpin
Bossi	Flecha	Ives	Pachelbel	Scarlatti
Brahms	Foster	Joplin	Prokofiev	Vecchi
Buxtehude	Frescobaldi	Josquin	Ravel	Victoria
Byrd	Gershwin	Landini	Scarlatti	Vivaldi
				Weber

Genres

Ballate	Etudes	Motets	Scherzos	Symphonies
Ballads	Fugues	Preludes	Sonatas	Virelais
Chorales	Madrigals	Ragtime	Sonatina	Waltzes
Contrafacta	Mazurkas	Quartets		

Programming Resources

- <http://humdrum.ccarh.org> → Humdrum Toolkit resource list
- <http://extras.humdrum.org> → Additional Humdrum tools
(& C++ parse library for Humdrum files)
- <http://music21.org> → Python music processing with some Humdrum import.

Relevant Conferences

- ISMIR (International Society of Music Information Retrieval)
<http://www.ismir.net>
- ICMC (International Computer Music Conference)
<http://www.computermusic.org>
- ACM (Association for Computing Machinery)
<http://www.acm.org/conferences>
- MCM (Mathematics, Computing and Music Conference)
<http://www.music.mcgill.ca/mcm2013/>
 - Biannual